

WHAT IS CLAIMED IS:

1. An apparatus for controlling a linear compressor, comprising:

5 a collision detection unit for detecting a collision of a piston with  
a valve due to the operations of the linear compressor;

a control unit for determining whether the collision of the piston  
occurs on the basis of an output signal from the collision detection unit,  
and resetting maximum amplitude data of the piston of the linear compressor  
when the collision occurs; and

10 a compressor driving unit for controlling the maximum amplitude of  
the piston of the linear compressor under the control of the control unit.

2. The apparatus according to claim 1, further comprising a first  
storage unit for storing preset maximum amplitude data, and a second storage  
15 unit for storing the reset maximum amplitude data from the control unit, the  
second storage unit being embodied as a non-volatile memory capable of data  
reading/writing.

3. The apparatus according to claim 1, wherein the collision  
20 detection unit includes:

a bridge unit having first and second coils serially connected to a  
ground, and first and second resistors connected in parallel with the first  
and second coils and serially connected to each other;

25 a core for linearly reciprocating by penetrating the first and second  
coils according to a movement of the piston of the linear compressor and

made of a magnetic substance;

a sine wave generating unit for providing a sine wave to the first resistor and the first coil;

5 first and second half-wave rectifying units, each comprised of a diode, for half-wave rectifying an output signal from the junction of the first and second resistors, and an output signal from the junction of the first and second coils, respectively;

a differential amplifying unit for differentially amplifying output signals from the first and second half-wave rectifying units;

10 a low pass filter for removing the high frequency component of an output signal from the differential amplifying unit; and

a peak detection unit for detecting a peak of an output signal from the low pass filter, and outputting the detected result to the control unit.

15 4. The apparatus according to claim 3, wherein the peak detection unit includes:

a diode for half-wave rectifying the output signal from the low pass filter;

20 a third resistor serially connected to an output terminal of the diode;

a capacitor connected between an output side of the third resistor and the ground for performing a smoothing operation; and

a fourth resistor connected between the output terminal of the diode and the ground.

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5. The apparatus according to claim 1, further comprising:

an amplitude calculation unit for calculating an amplitude of the piston on the basis of the output signal from the differential amplifying unit, and providing the calculated amplitude to the control unit; and

5 a displacement calculation unit for calculating a displacement of the piston according to the calculation result from the amplitude calculation unit, and providing the calculated displacement to the control unit.

6. A method for controlling a linear compressor, comprising the steps  
10 of:

a) presetting a maximum amplitude of a piston of the linear compressor;

b) detecting a signal when the linear compressor operates;

15 c) determining whether any collision of the piston has occurred on the basis of the detected signal;

d) resetting the maximum amplitude if it is determined that a collision of the piston has occurred at step c); and

e) driving the linear compressor according to the reset maximum amplitude.

20 7. The method according to claim 6, wherein the step d) includes the step of resetting a current maximum amplitude by subtracting the preset maximum amplitude from a previous maximum amplitude, so as to prevent collision of the piston.